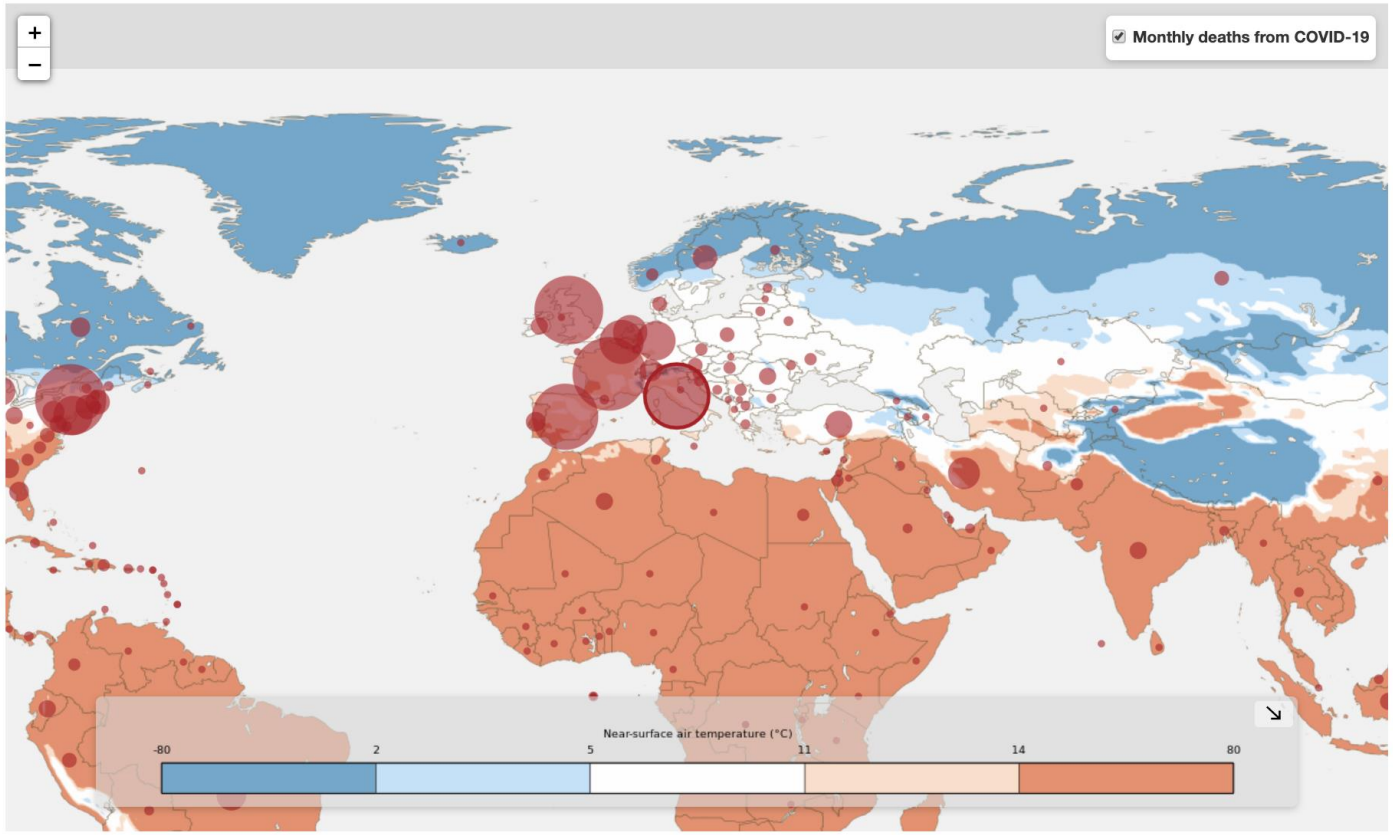
Climate Change

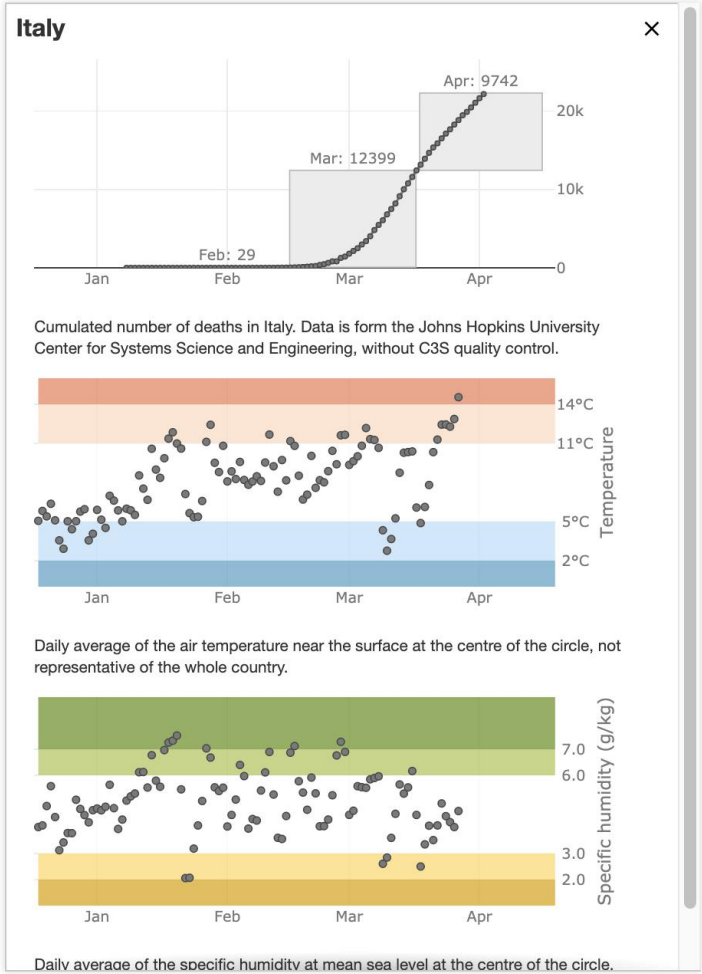
Climate Data Store - Monthly climate explorer for COVID-19

Recently published papers have suggested that, as happens with the diffusion of other viruses, air temperature and humidity could alter the spread of COVID-19. This application, provided by the *Copernicus Climate Change Service*, allows the user to explore some of these claims by plotting the average air temperature and humidity of the most recent months, alongside the mortality data obtained from *Johns Hopkins University*.

Month: April 2020

Variable: Temperature





Click on a red circle to see the time evolution for that location.

The white areas on the plots are regions where climate conditions are more conducive to the community diffusion of the disease according to recent scientific literature (Sajadi et al 2020, see documentation for details). Meteorological data are from *ERA5* reanalysis: hourly data on single levels and pressure levels and monthly averages on single levels and pressure levels. For the upcoming months, the average values based on the climatology of the most recent 20 years, are presented.

Disclaimers:

- COVID-19 related data are provided by *Johns Hopkins University Center for Systems Science and Engineering* (JHU CSSE), and are available at the following GitHub repository. These are used in the application without any prior quality control by C3S.
- The designations employed and the presentation of material on the map do not imply the expression of any opinion whatsoever on the part of the European Union concerning the legal status of any country, territory or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Documentation and source code

Climate Change

Monthly climate explorer for COVID-19

Overview | Application | Documentation | Source code

This application provides visualizations of data related to the COVID-19 virus spread along with climate information fron
Data Store. An interactive world map shows time averages of air temperature and humidity over selectable predefine
representing the number of deaths related to COVID-19, are placed on regions where the virus has spread. Clicking on ea
evolution of the number of fatalities in the corresponding region is shown, together with information on the local tempera
for the selected period.

This application is inspired by a series of research studies exploring the diffusion efficiency of the COVID-19 and the
different atmospheric stable conditions (e.g., see Sajadi et al., 2020; Lowen et al., 2007; Tamerius et al., 2013). Given t
COVID-19 virus and the lack of confirmed relationships between the infection and the relevant climate variables, the applic
be considered as an exploratory tool.

For simplicity, the map shows meteorological variables averaged over the same periods which fatalities numbers refer t
death. While the white regions in both the map and the time series correspond to the values identified in Sajadi et al. (202
used for the color palettes have been chosen arbitrarily. The number of fatalities has been chosen as indicator for the v
(number of confirmed cases and number of recovered patients). The values represented in the meteorological time series

COVID-19 related data are provided by Johns Hopkins University Center for Systems Science and Engineering (JHU CSSE),
the application without any prior quality control by C3S. Meteorological data are from ERA5 reanalysis: hourly data on sir
pressure levels.

The designations employed and the presentation of material on the map do not imply the expression of any opinion wha
any country, territory or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

List of user-selectable parameters

- Variable: temperature and humidity;
- Month;

Description of the graphical output

The application presents an interactive world map showing time averages of one variable, selectable via a drop-down me
can be selected: for months since the beginning of 2020, values for 2020 are shown; for the remaining months of the year,
placed in the centre of regions where the virus has spread; their size is proportional to the number of the deaths related t
a circle, a side window appears showing a plot of the daily time evolution of the local number of fatalities attributed to th
close to the centre of the circle, for the same time steps.

More details about the products are given in the Documentation section.

INPUT VARIABLES			
Name	Units	Description	Source
Daily cumulated number of deaths attributed to COVID-19 virus	Counts	Daily cumulated number of deaths attributed to COVID-19 virus	CSSEGISandData

Home | Search | Datasets | Applications | Toolbox | FAQ | Live

Monthly climate explorer for COVID-19

Overview | Application | Documentation | Source code

Copy to clipboard

Application source code

```
import calendar
import datetime

import cdstoolbox as ct

DAYS = [f"{day:02}" for day in range(1, 32)]
TIMES = [f"{hour:02}:00" for hour in range(0, 24)]
YEARS_CLIM = [str(year) for year in range(2000, 2020)]
VARIABLES_ID = {"Temperature": "2m_temperature", "Humidity": "specific_humidity"}
RETRIEVE_SPECS = {
    "2m_temperature": {"dataset": "reanalysis-era5-single-levels", "spec": {}},
    "specific_humidity": {
        "dataset": "reanalysis-era5-pressure-levels",
        "spec": {"pressure_level": "1000"},
    },
}
MONTH_NAMES = list(calendar.month_name)

DARK_GRAY = "rgb(72, 72, 72)"
GRAY = "rgb(122, 122, 122)"
LIGHT_GRAY = "rgb(182, 182, 182)"
LIGHTER_GRAY = "rgb(236, 236, 236)"
RED = "rgb(180,0,30)"
WINE_RED = "rgb(142, 14, 53)"

MONTH_LEN_2020 = [31, 29, 31, 30, 31, 30, 31, 31, 30, 31, 30, 31]
MONTH_ABBR = list(calendar.month_abbr)[1:]

TICKVALS_TIME = [f"2020-{month:02}-15" for month in range(1, 12)]
TICKVALS_TAS = [2.0, 5.0, 11.0, 14.0]
TICKVALS_HUS = [2, 3, 6, 7]

MARGIN = {"l": 0, "r": 50, "b": 30, "t": 0}

LAYOUT_DICT_COVID19 = {
    "yaxis": {
        "title": "",
        "side": "right",
        "gridcolor": LIGHTER_GRAY,
        "fixedrange": True,
```